

REDISCOVERY OF THE MANY-CROWNED
STRAWBERRY, *FRAGARIA MULTICIPITA* FERNALD

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ABSTRACT

Three stations of *Fragaria multicipita* Fernald were rediscovered in the general area of the type locality along Rivière Ste.-Anne in Gaspé, Québec. This taxon has not been accepted as a species by a number of recent compilers and monographers, but the plants retained distinctive features under greenhouse cultivation suggesting that taxonomic recognition may be appropriate, although the appropriate rank is unclear. The distinctive features include small size, small almost stalkless leaflets and a multicipital, more or less runnerless caudex. The plants were confined to dry sandy or silty, open riverine bars. Study of living plants of *F. multicipita* may help to further elucidate the nature of endemism in northeastern North America. It will also contribute additional information relevant to the classification of strawberries, this in turn providing the information needed for optimal germplasm protection and for increasing the low genetic diversity of strawberries cultivated in North America. Where *F. multicipita* occurs there is substantial variation in native species of *Fragaria*, and *in situ* as well as *ex situ* protection is desirable.

Key Words: *Fragaria multicipita*, strawberry, distribution, ecology, taxonomy, phytogeography, endemism, Gulf of St. Lawrence, germplasm protection, Québec, Canada

Fragaria multicipita was described by M. L. Fernald in 1908 on the basis of material that he collected with J. F. Collins (230, GH) along Rivière Ste.-Anne in Gaspé, Québec. The species was never discovered anywhere else and Fernald was unable to relocate the plants in 1927 when he found that the type locality had been used for a logging camp and the habitat there completely destroyed (Fernald, 1940). Many botanists visited the Ste.-Anne valley to search for *Fragaria multicipita*, but all searches were unsuccessful and it was assumed to be extinct (Drury, 1969; Scoggan, 1978). Having been known only from the type collection for 84 years, it was rediscovered in 1992 at three separate localities along the Rivière Ste.-Anne. Pressed specimens of recently collected plants have been deposited at DAO and MT and living material is being propagated for further research. The purposes of the following notes are to outline the history of this taxon, and to provide some new information resulting from its rediscovery, along with an indication of its potential significance.

TAXONOMIC HISTORY

Fragaria multicipita was retained as a species by Rydberg (1908) in his monograph produced the same year that Fernald described the plant. It was one of three species of strawberries recognized in northeastern North America by Fernald in 1950, and it was accepted by Scoggan the same year in his flora of Bic and the Gaspé Peninsula.

Most authors after 1950 either overlooked it, rejected it entirely, or placed it in synonymy under *F. virginiana* with neither explanation nor comment. Among the reasons for this are the two facts that it was not found again (see above) and that the most influential botanists concerned with northeastern North America at the time were "lumpers" who considered taxa described by Fernald as the products of extreme splitting. Gleason (1952) placed *F. multicipita* in synonymy under *F. virginiana* var. *terrae-novae* (Rydb.) Fern. & Wieg. *Fragaria multicipita* was not mentioned by Boivin (1966) or Gleason and Cronquist (1963, 1991). Staudt (1962) in a monographic work on *Fragaria* did not mention *F. multicipita*, nor was it mentioned by him (1989) in a recent synopsis of the species of *Fragaria*. Scoggan (1978) rejected *F. multicipita* from the flora of Canada, but he nevertheless discussed it in some depth. He correctly noted that Staudt (1962) had treated plants of *F. vesca* from Europe that were without runners as *f. eflagellaris* (Dcne.) Staudt, although he (Staudt) had not mentioned *F. multicipita*. Kartesz and Kartesz (1980) treated *F. multicipita* as a synonym of *F. virginiana* ssp. *virginiana*. With this lack of acceptance it is not surprising that it was not mentioned in recent listings of the rare plants of Québec (Bouchard et al., 1983; Lavoie, 1992).

Regardless of a recent lack of acceptance, *F. multicipita* has not been lost completely. Rice et al. (1982) listed it as one of four species of *Fragaria* occurring in Canada and the United States. A number of recent studies have found Fernaldian taxa to be discrete and worthy of recognition. Among these are studies of other northeastern endemic species named by Fernald such as *Aster anticostensis* Fernald and *Aster laurentianus* Fernald, both of which have recently proved worthy of species rank (Brouillet and Labrecque, 1987; Houle and Haber, 1990; Labrecque and Brouillet, 1990). Despite taxonomic recognition of some aberrations and an untenable varietal concept, taxa described by Fer-

nald are now more widely regarded as the potentially astute observations of one of North America's great taxonomists. As noted by Drury (1969); "Fernald's judgement and ability to separate cogent from trivial differences were amazing."

DISTINCTIVE FEATURES

Although Fernald (1908) described the plant as caespitose with the caudex divided into several to many crowded upright branches that were very rarely stoloniferous, and he named it *multicipita* in reference to the multicipital caudex (i.e., the root top or stem base with many crowns or heads), it was not until 1950 in the 8th edition of Gray's manual that it became completely clear that this is what he regarded as one of the most distinctive characters. Additionally Fernald (1950) used the relatively small leaves (less than 3 cm long) with sessile leaflets possessed by *F. multicipita* to distinguish it from *F. virginiana*.

Rydberg (1908) also used the lack of runners and the small sessile leaflets to distinguish *F. multicipita* from other species, but he also employed its short petals less than 5 mm long to distinguish it from his *Fragaria terrae-novae* Rydb., which most subsequent authors placed with *F. virginiana*, either as a synonym or as a variety (e.g., Fernald, 1950). Scoggan (1950) utilized Rydberg's (1908) key characters in his flora of Bic and the Gaspé Peninsula. *Fragaria multicipita* was basically distinguished as a small-leaved bushy strawberry lacking runners (Figure 1) by those taxonomists who recognized it.

REDISCOVERY AND RECENT OBSERVATIONS

Much of the lower valley of Rivière Ste.-Anne is a broad and more or less flat floodplain. Although the river is relatively fast flowing, it meanders through riverine deposits of gravel, sand and silt. The disturbance and erosion from periodic torrential flooding accompanied by ice-scouring in spring, and later deposition results in extensive open areas near the river. Substrates vary in amounts of disturbance as well as composition and wetness, the latter a consequence of height and slope. Although some of the deposits are without vegetation cover, where disturbance is limited or deposition less recent, a vegetation cover has developed. *Fragaria multicipita* was rediscovered on dry, open, gentle slopes



Figure 1. The holotype of *F. multiceps* (Fernald & Collins 230, GH).

on bars composed of silt, fine sand, or gravel (Figure 2) where few other plants occurred and the vegetation cover was sparse. At 4 km SSE of Ste.-Anne-des Monts, 20 plants were found. At approx. 9 km SSE of Ste.-Anne-des-Monts, 52 plants were found.

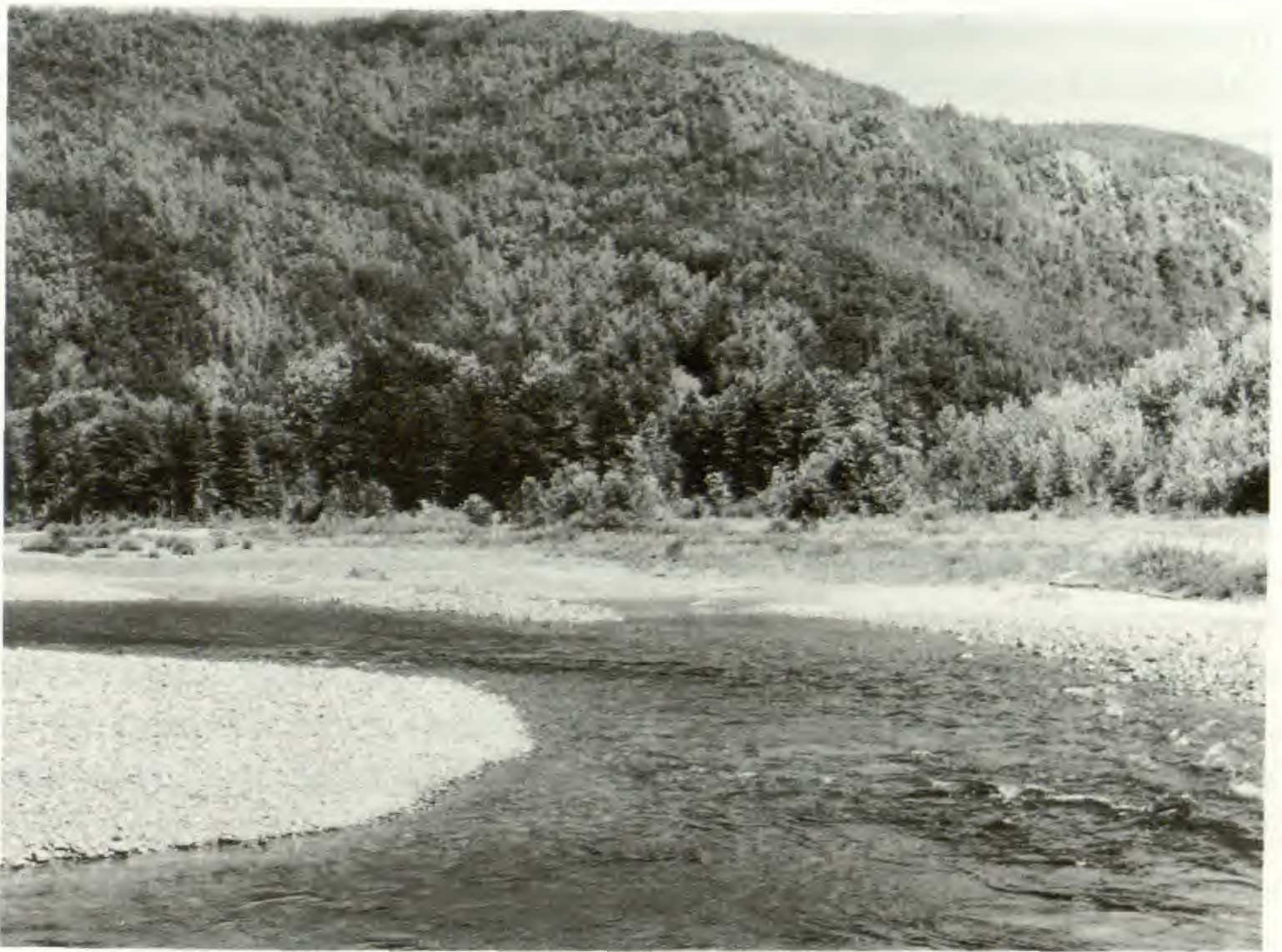


Figure 2. A, Rivière Ste.-Anne, Gaspé, showing extensive open, silty sandy and gravel bars where *Fragaria multicipita* still occurs. The habitat extends across the center of the photograph between the barren, rocky rivershore and the encroaching forest.

At approx. 13 km SSE of Ste.-Anne-des-Monts, 15 plants were found. Ten of the plants found at the station 9 km SSE, growing on an isolated bar differed from the type material only in having spreading instead of appressed trichomes on the leaf petioles.

Other species growing with or near to *Fragaria multicipita* included *Achillea millefolium* L. ssp. *borealis* (Bong.) Breitung, *Bromus ciliatus* L., *B. inermis* Leyss., *Chrysanthemum leucanthemum* L., *Dryas drummondii* Richards., infrataxa of *Elymus trachycaulus* (Link) Gould in Shinn., *Elytrigia repens* (L.) Nevski, *Fragaria virginiana* Miller, *Galium mollugo* L., *Oenothera parviflora* L., *Poa compressa* L., *P. pratensis* L., *Rubus pubescens* Raf. and *Silene vulgaris* (Moench) Garcke.

The variation in *Fragaria* along Rivière Ste.-Anne is remarkable. In addition to *F. multicipita* with either spreading or appressed trichomes, *F. vesca* L. ssp. *americana* (Porter) Staudt occurs in moist and more shaded places. Finally, plants referable to *F. virginiana* Miller but of different heights, had divergent or

appressed ascending trichomes on the petioles, large or small leaflets of various shapes and numbers with long or short petioles, and stolons of various lengths, colors and thicknesses. One obvious potential explanation for the variation is the remarkable range of adjacent habitats, but a mingling of glacial and preglacial relicts (Drury, 1969; Fernald, 1925) with more recent invaders is also a possibility.

The Ste.-Anne rivershore environment includes some interesting subarctic or alpine elements, in addition to *Dryas drummondii*, such as *Carex atratifomis* Britton, *C. capillaris* L., and *C. media* R. Br. These elements present a striking contrast to the surrounding forest and are only a few of the species included in the distinct and restricted rivershore flora of the region (Labrecque and Brouillet, 1990; Scoggan, 1950). Some of these elements, such as the arctic and cordilleran *Lathyrus venosus* Muhl. var. *intonsus* Butters & St. John, are known from only one, or a very few, eastern stations. Other well established northeastern endemics, such as *Aster anticostensis* Fernald and *Pedicularis furbishiae* S. Watson, are also species of disturbed rivershores. The Gaspé Peninsula and the general region of the Gulf of St. Lawrence have been identified as an evolutionary center (Argus and McNeill, 1974) and an area of relatively high endemism (e.g., Marie-Victorin, 1938; Morisset, 1971; Argus, 1977; Bouchard et al., 1985). *Fragaria multicipita* appears to be similar to many of the Gulf of St. Lawrence endemics in being a plant of open, disturbed habitats that is rare and characterized by small populations (Marie-Victorin, 1938; Morisset, 1971; Wynne-Edwards, 1939).

MATERIAL EXAMINED: CANADA: Québec: Gaspé Ouest Municipality: Cap Chat Township: River Ste. Anne-des-Monts, 14–17 July 1906, *M. L. Fernald & J. F. Collins* 230 (HOLOTYPE-GH!, ISOTYPE-GH!); 9 km SSE of Ste.-Anne-des-Monts (hwy 132) beside Rivière Ste.-Anne, 49°04'40"N, 66°29'55"W, 16 July 1992, *P. M. Catling & V. R. Catling* 13251 (DAO, MT).

SIGNIFICANCE

The rediscovery of *F. multicipita* is significant in many respects. It has already resulted in additional information relevant to classification. When portions of 50 plants representing variation in *Fragaria* along the Ste.-Anne rivershore were grown beside each

other in a greenhouse in similar pots and similar soil mix, all retained the distinctive morphological features seen in the field and in some cases these features became even more pronounced. For example, plants referable to *Fragaria multicipita* grew into large runnerless "bushes" with 50–100 ramets, but retained their small size and small nearly stalkless leaflets, and either did not produce runners or produced a few very short runners to 10 cm long. The evidence of localized genetic differentiation, as well as a rather distinct habitat, are consistent with species rank, but the more important point is that there is now living material available for the further assessment of rank and the study of variation.

Fragaria multicipita was one of the species used by Fernald (1925) to support his "persistence" or "nunutak" hypothesis, and it was also one of 45 species, potentially supporting the hypothesis, that were screened by Drury (1969). The explanation for, and nature of endemism and unusual patterns of plant variation in the Gulf of St. Lawrence region has still to be thoroughly explored, although recent studies (e.g., Brouillet and Labrecque, 1987; Labrecque and Brouillet, 1990; Houle and Haber, 1990) have contributed much useful information. As a non-halophytic and non-serpentine taxon, *F. multicipita* is especially relevant to the persistence concept and to an understanding of northeastern endemism. Drury (1969) noted that, to advance knowledge in these areas, what was needed most of all were detailed studies of ecology, natural history, and variation of some of the most critical endemic taxa, such as *F. multicipita*.

An understanding of variation in native wild strawberries and the protection of this variation has become more relevant to agriculture over the past several years for two reasons. Firstly, it has become more widely recognized that North American strawberry production has a narrow germplasm base (e.g., Luby et al., 1992). Secondly, the use of native wild strawberry germplasm to increase genetic diversity of cultivated strawberries is increasingly important because of the need to reduce the use of chemicals for disease and pest control, while at the same time increasing production efficiency (e.g., Daubeney, 1990).

Two additional points arise from these considerations. One is that there are in North America important centers of crop-relative diversity where *in situ* protection is desirable, the valley of Rivière Ste.-Anne being an example. Secondly information on patterns of variation within species, that would be useful for purposes of

germplasm protection, are inadequate, even for some of our most familiar native plants such as strawberries.

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LITERATURE CITED

- ARGUS, G. W. 1977. The conservation of Canadian rare and endangered plants, pp. 139-143. *In*: T. Mosquin and C. Suchal, Eds., *Canada's Threatened Species and Habitats*. Canadian Wildlife Federation, Ottawa.
- AND J. MCNEILL. 1974. Conservation of evolutionary centers in Canada, pp. 131-141. *In*: J. S. Maini and A. Carlisle, Eds., *Conservation in Canada, A Conspectus*. Canadian Forestry Service Publication 1340.
- BOIVIN, B. 1966. Énumération des plantes du Canada II—Lignidées. *Naturaliste Can.* 93: 371-437.
- BOUCHARD, A., D. BARABÉ, Y. BERGERON, M. DUMAIS AND S. HAY. 1985. La phytogéographie des plantes vasculaires rares du Québec. *Naturaliste Can.* 112: 283-300.
- , ———, M. DUMAIS AND S. HAY. 1983. Les plantes vasculaires rares du Québec. *Syllogeus* (National Museum of Canada) No. 48: 74 pp.
- BROUILLET, L. AND J. LABRECQUE. 1987. *Aster gaspensis* Victorin: nombre chromosomique et hybridation naturelle avec l'*A. novi-belgii* L. *Naturaliste Can.* 114: 159-165.
- DAUBENY, H. A. 1990. Strawberry breeding in Canada. *Hortscience* 25: 893-894.
- DRURY, W. H. 1969. Plant persistence in the Gulf of St. Lawrence, pp. 105-148. *In*: K. N. H. Greenidge, Ed., *Essays in Plant Geography and Ecology*. Nova Scotia Museum, Halifax.
- FERNALD, M. L. 1908. Notes on some plants of northeastern North America. *Rhodora* 10: 46-55.
- . 1925. Persistence of plants in unglaciated areas of Boreal America. *Mem. Amer. Acad. Arts Sci.* 15: 238-342.
- . 1940. The problems of conserving rare native plants. *Smithsonian Report* 1939: 375-391.
- . 1950. *Gray's Manual of Botany*, 8th ed. American Book Co., New York.
- GLEASON, H. A. 1952. *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*. Hafner Press, New York.
- AND A. CRONQUIST. 1963. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. D. van Nostrand Co., New York.
- AND ———. 1991. *Manual of vascular plants of northeastern United States and adjacent Canada*, 2nd ed. New York Botanical Garden, Bronx, New York.

- HOULE, F. AND E. HABER. 1990. Status of the Gulf of St. Lawrence Aster, *Aster laurentianus* (Asteraceae), in Canada. *Can. Field-Nat.* 104: 455–459.
- KARTESZ, J. AND R. KARTESZ. 1980. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland, Vol. II. The Biota of North America. University of North Carolina Press, Chapel Hill. 498 pp.
- LABRECQUE, J. AND L. BROUILLET. 1990. *Aster anticostensis*, an endemic of northeastern North America: biology and conservation. *Rhodora* 92: 129–141.
- LAVOIE, G. 1992. Plantes vasculaires susceptibles d'être désignées menacées ou vulnérables au Québec. Ministère de l'Environnement. Québec, Canada.
- LUBY, J. J., J. F. HANCOCK, JR. AND J. R. BALLINGTON. 1992. Collection of native strawberry germplasm in the Pacific northwest and northern Rocky Mountains of the United States. *Hortscience* 27: 12–17.
- MARIE-VICTORIN, F. 1938. Phytogeographical problems of eastern Canada. *Amer. Midl. Nat.* 19: 489–558.
- MORISSET, P. 1971. Endemism in the vascular plants of the Gulf of St. Lawrence region. *Naturaliste Can.* 98: 167–177.
- RICE, W. E. et al. Compilers. 1982. National list of scientific plant names, 2 vols. Soil Cons. Serv. Publ. SCS-TP-159.
- RYDBERG, P. A. 1908. *Fragaria*. *North American Flora* 22: 356–365.
- SCOGGAN, H. J. 1950. Flora of Bic and the Gaspé Peninsula. *National Museum of Canada Bulletin No. 115*: 399 pp.
- . 1978. The flora of Canada, part 3. *National Museum of Natural Sciences Publications in Botany* 7(3): 547–1115.
- STAUDT, G. 1962. Taxonomic studies in the genus *Fragaria*. *Can. J. Bot.* 40: 869–886.
- . 1989. The species of *Fragaria*, their taxonomy and geographic distribution. *Acta Hort.* 265: 23–33.
- WYNNE-EDWARDS, V. C. 1939. Some factors in the isolation of rare alpine plants. *Trans. Roy. Soc. Can. Sect. 5*: 35–41.

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